TESIS

MULTIVARIATE TIME SERIES (STATE SPACE) UNTUK MENGETAHUI POLA PERAMALAN PENJUALAN BEBERAPA OBAT DI APOTIK RSUD KABUPATEN SIDOARJO

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TESIS

Untuk Memperoleh Gelar Magister
Dalam Program Studi Ilmu Kesehatan Masyarakat
Pada Program Pascasarjana Universitas Airlangga

Oleh :
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ABSTRACT

This research generally intends to determine a forcasting pattern of selling of some medicine in the pharmacy of RSUD kabupaten Sidoarjo by using multivariate time series (state space) approach, but specifically it intends to forcast the turnover of some medicine in the next 12 months.

Population of the research are the number of medicines that have sold in the pharmacy of RSUD Kabupaten Sidoarjo, while the sample are the number of the most sold medicines since August 1996 until august 2001, they are Amoxicillin 250 mgs,Amoxicillin 500 mgs, and Amphicillin 500 mgs. The dependent variables are the predicted variables (there are 3 variables), while the independent variable is time. The data of multivariate time series was analyzed by using SAS program and supported by MINITAB program.

The result of data analyzed by using multivariate time series (state space) approach has multivariate autoregressif form which match with VAR (1). The final output of state space model of parameter estimation after frequently evaluated are as follows :

$$\begin{bmatrix} X_t \\ Y_t \\ Z_t \end{bmatrix} = \begin{bmatrix} 0.314 & 0.000 & 0.106 \\ 0.000 & 0.197 & 0.000 \\ 0.000 & 0.000 & 0.583 \end{bmatrix} \begin{bmatrix} X_{t-1} \\ Y_{t-1} \\ Z_{t-1} \end{bmatrix} + \begin{bmatrix} a_{1,t} \\ a_{2,t} \\ a_{3,t} \end{bmatrix}$$

The matrix equation above can be interpreted as follows :

- Model Amoxicillin 250 mgs : $X_t = 0.314\, X_{t-1} + 0.106\, Z_{t-1} + a_{1,t}$, means that the number of amoxicillin 250 mgs which sold in month t were equal

with the number of amoxicillin 250 mgs in one month before (t-1) multiplied with 0.314 plus the number of Amphicillin 500 mgs which have sold in one month before (t-1) multiplied with 0.106.

- Model Amoxicillin 500 mgs : $Y_t = 0.197\ Y_{t-1} + a_{2,t}$, means that the number of amoxicillin 500 mgs which have sold in month t were equal with the number of Amoxicillin 500 mgs which have sold in one month before (t-1) multiplied with 0.179.
- Model Amphicillin 500 mgs : $Z_t = 0.583\ Z_{t-1} + a_{3,t}$, means that the number of Amphicillin 500 mgs which have sold in month t were equal with the number of Amphicillin 500 mgs which have sold in one month before (t-1) multiplied with 0.179.

The Outcome of forcasting that was given by state space model for the next 12 months can be seen as follows :

Observation	Amoxicillin 250mgs (X)	Amoxicillin500mgs (Y)	Amphicillin500mgs (Z)
62	1011	11976	2353
63	1215	11873	2968
64	1344	11853	3326
65	1423	11848	3535
66	1469	11848	3657
67	1497	11847	3728
68	1513	11847	3769
69	1523	11847	3793
70	1529	11847	3807
71	1532	11847	3816
72	1534	11847	3820
73	1535	11847	3823

Key Word : Multivariate Time series, State Space, ACF, PACF, AIC, Canonical Correlation Analysis.